

SHELLS FROM THE GREAT AUSTRALIAN BIGHT.

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[Read October 10, 1912.]

PLATES X. TO XIV. AND XVI.

In March, 1912, the Federal Minister of Trade and Customs granted me permission to go on the trawler "Endeavour" during a trip of investigation in the Bight.

The area covered extended from 30 to 120 miles west of the longitude of Eucla, along the 100-fathom line, the trawl being taken across this line from 75 fathoms to 120 fathoms. The 100-fathom line followed the curve of the coast fairly uniformly at a distance of about 60 miles. The shells obtained were those brought up incidentally in the large trawl when this was gathering fish. As its mesh was comparatively large, very few small shells were taken. The fauna was consequently quite different from that I have dredged off the South Australian coast in deep water before, when either a very fine-meshed net-dredge or a conical iron bucket-dredge has been used, and only smaller forms have been obtained. Mr. Dannevig, the Director of the Fisheries investigation, very kindly gave me two hauls with my bucket-dredge in deep water, and so supplied me with material for comparison with what I have taken in a similar manner and at equal depths elsewhere.

I am pleased to take this opportunity of expressing my thanks to the Ministerial heads of the Department in the Commonwealth and in the State for the opportunity of securing much interesting material, and also to the officers and men on the trawler for their very ready and interested help.

In this paper, owing to lack of time, I am only able to deal with the larger Gasteropods. I hope to deal with the smaller forms and with the Pelecypods in the future.

Phasianella australis, Gmelin.

Buccinum australe, Gmelin, Sys. Nat., 1788, p. 3490, No. 173.

One large specimen, dead, in poor condition, dredged in 100 fathoms 90 miles west of Eucla.

Clanculus leucomphalus, Verco.

Clanculus leucomphalus, Verco, Trans. Roy. Soc., S.A., 1905, vol. xxix., p. 168, pl. xxxi., figs. 9-11.

One example was taken alive in 72 fathoms 40 miles west of Eucla, rather larger than the type, being 8.5 mm. high and 12 mm. in diameter.

Calliostoma hedleyi, Pritchard and Gatliff.

Calliostoma hedleyi, Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1902 (1901), vol. xiv. (New Series), part 2, p. 182, pl. ix., fig. 4: *Type locality*—Western Port (Gatliff); also *op. cit.*, 1906 (1905), vol. xviii. (New Series), part 2, p. 65; Hedley and May, Records Austr. Mus., 1908, vol. vii., p. 109, "100 fathoms, off Cape Pillar, Tasmania."

One example, taken in 80 fathoms 80 miles west of Eucla.

Crepidula immersa. Angas.

Crepidula immersa, Angas, Proc. Zool. Soc., London, 1865, p. 57, pl. ii., fig. 12: *Type locality*—"Port Lincoln, South Australia"; also p. 174, No. 118; Watson, 1886, "Chall.," Zool., vol. xv., p. 460, No. 4, "Bass Strait"; Tryon, Man. Conch., 1886, vol. viii., as a synonym of *C. onyx*, Sowerby, p. 128, pl. xxxviii., figs. 46, 47; J. B. Wilson, 1887, Vict. Nat., p. 116, "Port Phillip, Victoria"; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1900, vol. xii., p. 201; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 377, as a synonym of *C. unguiformis*, Lamarck, Tasmania; also p. 445.

Taken in 75 fathoms 80 miles west of Eucla, up to 44.5 mm. in length, 3 quite fresh.

Caledoniella contusifomis, Basedow.

Caledoniella contusifomis, Basedow, Trans. Roy. Soc., S.A., vol. xxix., 1905, p. 183, pl. xxviii., fig. 1; *var. pulchra*, pl. xxviii., fig. 3.

Taken in 72 to 88 fathoms, 1, *C. pulchra*; in 88 to 100 fathoms, very many; in 100 fathoms, very many; in 96 to 84 fathoms, 12 specimens; and in 95 to 120 fathoms, very many. The trawling extended from 40 miles to 120 miles west of the longitude of Eucla. The examples were so numerous that we kept as many as we thought we might want and threw the rest overboard with the rubbish. They seemed to be most plentiful when large masses of green, sponge-like material were brought up. They were of varying sizes, but attained larger dimensions than the type, the shell reaching a maximum of 37 mm. long by 29 mm. wide. We did not secure a single specimen of the other varieties of this species, such as *testudinis* or *labyrinthina*, nor of the typical *contusifomis*, though variations in colour-marking were found in *C. pulchra*. Some had just the same colouration as

the example figured, the shield "of a rich yellow ground-colour, with large circular or oval lighter blotches surrounded by wreaths of black." A very large number were altogether destitute of the black wreaths, and had pale-yellow areas on the darker-yellow ground. Others had opalescent-white spots instead of the pale-yellow, and others again had yellow spots on an opalescent-white ground.

Balch, of Boston, Massachusetts, in a paper on a new Labradorean species of *Onchidiopsis*, in the Proc. U.S. Nat. Mus., vol. xxxviii., No. 1761, p. 469, places *Caledoniella* in the subfamily *Velutininae*, of the family *Lamellariidae*; but in order to locate the genus definitely in its subfamily it is necessary to determine whether the animal has the sexes separate or united, and whether it has an expiratory cleft.

Turritella runcinata, Watson.

Turritella runcinata, Watson, Jour. Linn. Soc., vol. xv., 1881, p. 217; Verco, Trans. Roy. Soc., S.A., 1910, vol. xxxiv., p. 122.

Taken in 50 fathoms west of Eucla, 2; 75 fathoms 80 miles west of Eucla, 3; 80 fathoms 80 miles west of Eucla, 4; 101 fathoms 80 miles west of Eucla, 1. It may reach 64 mm. in length by 17 mm. in width. They were all dead.

Vermicularia flava, Verco.

Vermicularia flava, Verco, Trans. Roy. Soc., S.A., 1907, vol. xxxi., p. 214, fig. 1; Gatliff and Gabriel, Proc. Roy. Soc., Victoria, 1908, vol. xxi. (New Series), part 1, p. 376, "Western Port"; Hedley and May, Records Austr. Mus., 1908, vol. vii., p. 111, "100 fathoms, off Cape Pillar, Tasmania"; Hedley, Commonwealth of Australia, Fisheries, 1911, part 1, p. 93, "100 fathoms, off Cape Wiles."

Taken in 80 fathoms 80 miles west of Eucla, alive; in 100 fathoms 90 miles west of Eucla.

Siliquaria australis, Quoy and Gaimard.

Siliquaria australis, Quoy and Gaimard, Voy. "Astrolabe," Zool., 1834, vol. iii., p. 302; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 378, recorded for Tasmania; Menke, Moll. Nov. Holl., p. 10, No. 28, recorded for Western Australia; Angas, Proc. Zool. Soc., 1865, p. 174 (*Tenagodes*), recorded for South Australia; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1900, vol. xii. (New Series), part 2, p. 204, recorded for Victoria.

Dredged alive in large masses of yellow sponge in 80 fathoms 80 miles west of Eucla, and in 75 fathoms; in 100 fathoms 90 miles west of Eucla, and in 72 fathoms 40 miles west of Eucla.

Siliquaria weldii, Tenison-Woods.

Tenagodus weldii, Tenison-Woods, Proc. Roy. Soc., Tasmania, 1876 (1875), p. 144, "East coast, Tasmania"; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1900, vol. xii. (New Series), part 2, p. 205 (*Tenagodes*), "Port Phillip, Western Port"; May, Proc. Roy. Soc., Tasmania, 1902, p. 110, "Type in Tas. Mus., Hobart."

Siliquaria (Pyxipoma), Tryon, Man. Conch., 1886, vol. viii., p. 191, pl. lviii., fig. 28; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 378; Hedley, Records Austr. Mus., 1905, vol. vi., part 2, p. 42, "111 fathoms, off Cape Byron, New South Wales"; Hedley and May, *op. cit.*, 1908, vol. vii., No. 2, p. 111, "100 fathoms, off Cape Pillar."

Taken in 100 fathoms 90 miles west of Eucla, in sponge.

Siliquaria anguina, Linnæus.

Tenagodus anguinus, Linnæus, Mus. Lud. Ulr., 701, No. 431, 1758.

Serpula anguina, Born, Mus. Caes. Vindobon., Test., Tome 18, fig. 15; Gmelin, Sys. Nat. Linn., 1789, vol. vi., p. 3743, "Indian Ocean."

Siliquaria anguina, Chenu, Illus. Conch., p. 1, pl. i., figs. 1, 2; Reeve, Conch. Icon., pl. iii., Sp. 7, figs. 7a, 7b, 7c, 7d, 7e; Tryon, Man. Conch., 1886, vol. viii., p. 190, pl. lviii., figs. 23-25; Sowerby, Thes. Conch., vol. v., 1887, p. 165, No. 13, pl. 481 (*Siliquaria* ii.), figs. 11-13.

Serpula muricata, Born, Mus. Caes. Vindobon., Test., Tome 18, fig. 16.

Siliquaria muricata, Lamarek, Anim. S. Vert. (2nd Edition, Deshayes, etc.), 1838, vol. vi., p. 584, "Indian seas"; Chenu, Illus. Conch., p. 2, pl. ii., figs. 13, 14, "Indian seas and New Holland."

Gmelin, Reeve, Tryon, and Sowerby give *S. muricata* as a synonym of *S. anguina*.

Taken in 100 fathoms 90 miles west of Eucla, several, in a piece of blackish-purple sponge, which stains them somewhat violet. It has the *S. muricata* form, and is easily distinguished from our other two southern Australian species *S. australis* and *S. weldii* by its squamate longitudinal ribs.

Cypræa thersites, Gaskoin.

Cypræa (Aricia) thersites, Gaskoin, Proc. Zool. Soc., 1848, p. 90: *Type locality*—"Salt Creek, Yorke Peninsula, South Australia, on clusters of *Zoophytes* at 2 to 3 fathoms."

Dredged alive in 72 fathoms 60 miles west of Eucla, 1; in 100 fathoms 90 miles west of Eucla, 1; in 75 to 120 fathoms 40 miles west of Eucla, 2. This species has hitherto appeared to be of an exceedingly limited *habitat*, being taken only in Gulf St. Vincent and Spencer Gulf. Once I dredged a large living specimen at the mouth of the American Inlet, off Hog Bay, Kangaroo Island. But it has not been recorded

from Victoria, Tasmania, or Western Australia. To meet it in about 100 fathoms in the Great Australian Bight was a surprise. The specimens obtained were all comparatively young. Their outer lip was formed and toothed, and the base was flattened. The youngest is nearly white, with a faint bluish-grey tint, and has two broad darker bands running across the shell from one lateral margin to the other. There are about 25 brown spots on the right margin and 10 on the left. The next more mature specimen has a flatter base, which projects more at both ends, which are faintly tinted with orange; the ground-colour is more bluey-grey, and numerous transverse interrupted streaks of brown cross the shell, more marked on the left side; numerous smaller spots are superadded to those on the right border. The third example is nearly mature, is of a still darker bluish-grey, with much more numerous and darker and larger blackish-purple spots on both margins, especially the left, and with darker brown dashes on the dorsum arranged antero-posteriorly. They differ from specimens found in our gulfs in their much lighter colour. The latter, even when much less mature, long before they show any sign of a formed lip, are of a yellow-orange colour, and are abundantly covered with dark-rusty-brown spots and blotches. The pallor of the deep-sea examples is very striking.

Cypræa reevei, Gray.

Cypræa reevei, Gray, Sowerby, Conch. Illus., 1832, *Cypræidæ*, p. 2, No. 15*, fig. 52: *Type locality*—Garden Island, mouth of the Swan River"; Menke, 1843, Moll. Nov. Holl., p. 29; Tryon, Man. Conch., 1885, vol. vii., p. 166, pl. iii., figs. 24, 25.

Taken in 100 fathoms 90 miles west of Eucla, 5 alive; in 105 fathoms 30 miles west of Eucla, 1 alive. This species is taken in King George Sound on rocks at low tides alive, and it is found alive in 100 fathoms. Most of the examples taken are more pallid than those in-shore, but there are the same pink tips and spire and obsolete transverse darker bands. It seems to have come round from the west, and to have reached South Australia, where it is known to extend as far as Backstairs Passage. From Victoria and Tasmania it is unrecorded.

Cypræa pulicaria, Reeve.

Cypræa pulicaria, Reeve, Proc. Zool. Soc., 1845, *hab. (?)*; Conch. Icon., 1846, Sp. 84, pl. xvii., fig. 84; Tryon, Man. Conch., 1885, vol. vii., p. 189, pl. xvi., figs. 59, 60.

Taken in 80 fathoms 80 miles west of Eucla, 1 alive; in 100 fathoms 80 miles west, 3 alive; in 100 fathoms 90 miles west, 6 alive. They vary from 17 mm. to 24 mm. in

length, are of a greyish-yellowish or yellowish-brown colour. There may be no dots whatever, or only a few brown dots about the right border, or many scattered all over the surface irregularly, or some of these may be arranged in three transverse rows, or besides other scattered sparse dots, there may be two or three obscure transverse bands of brown blotches. They are narrower and more cylindrical than the *C. piperata*, Solander, though probably only a variant.

Cypræa umbilicata, Sowerby ; var. **armeniaca**, *n. v.*

Pl. x, figs. 1-3.

1825, *Cypræa umbilicata*, Sowerby, G. B., Catalogue of Shells in collection of Earl of Tankerville, Appendix, p. xxx., No. 2260, pl. iv. and v.: *Type locality* unknown.

1826, *Cypræa umbilicata*, Sowerby, G. B., Zool. Jour., 1826. vol. ii., p. 494.

1828, Wood, Supp. Index, Test., 1828, p. 9, pl. iii., fig. 13, *hab.* unknown.

1828, *Cypræa umbilicata*, Sowerby, Gray, Zool. Jour., vol. iv., p. 77, and Sowerby, G. B., p. 221.

1837, *Cypræa pantherina*, Solander MSS., var. *umbilicata*, Sowerby, Conch. Illus. *Cypræa*, p. 2, No. 5, fig. 169.

1844, *Cypræa tigrina*, Lamarck, Deshayes, Anim. S. Vert. (2nd Edition, Deshayes, etc.), vol. x., p. 504.

1845, *Cypræa pantherina*, Lamarck, Reeve, Conch. Icon., pl. iii., Sp. 7.

1848, *Cypræovula umbilicata*, Sowerby, Gray, Proc. Zool. Soc., London, pp. 124, 125.

1867, *Cypræovula umbilicata*, Sowerby, Angas, Proc. Zool. Soc., London, p. 205.

1872, *Cypræovula umbilicata*, Sowerby, Brazier, Proc. Zool. Soc., London, 1872, p. 86.

1880, *Cypræa umbilicata*, Sowerby, Cox, Proc. Linn. Soc., N.S.W., 1879, p. 386.

1880, *Cypræa umbilicata*, Sowerby, Thes. Conch., vol. iv., p. 21, Sp. 61, pl. vii., figs. 42-44.

1883, *Luponia umbilicata*, Sowerby, Brazier, Proc. Linn. Soc., N.S.W., vol. vii., p. 117.

1885, *Cypræa umbilicata*, Sowerby, Tryon, Man. Conch., vol. vii., p. 181.

1898, *Cypræa umbilicata*, Sowerby, Beddome, Proc. Linn. Soc., N.S.W., vol. xxii., 1897, pp. 564-568, pl. xx., figs. 1, 2.

1900, *Cypræa umbilicata*, Sowerby, Pritchard and Gatliff, Proc. Roy. Soc., Victoria, vol. xii. (New Series), part 2, p. 187.

1901, *Cypræovula umbilicata*, Sowerby, Tate and May, Proc. Linn. Soc., N.S.W., vol. xxvi., 1901, p. 374.

Cypræa umbilicata, Sowerby

This species was erected upon a shell in the collection of the Earl of Tankerville, and was described and figured in

the Appendix to the Sale Catalogue of the Earl's collection by G. B. Sowerby, F.L.S., in 1825. Only two specimens were known—the type and one in the cabinet of Mr. Sowerby. The type came into the possession of the British Museum. Its *habitat* was unknown. He remarked its resemblance to *C. tigris*, but in the Zoological Journal of 1826 indicated its diagnostics.

The name *C. umbilicata* had been previously attached to a shell by Solander, which Gray thinks was *C. pyrum*; but as Solander's name was only in manuscript, and was never published, Sowerby's specific name stands.

In 1828 Dr. Gray discussed it, and suggested that as only one specimen was known it might be merely a monstrosity, a deformed *C. tigris*; but if a good species, it should be placed in his newly created genus *Cyprovula*.

G. B. Sowerby replied that two specimens were known which were quite alike; this supported the probability of its being a good species, allied rather to *C. pantherina* than to *C. tigris*.

In 1837, however, Mr. Sowerby, in his Conchological Illustrations, registered his species as a variety of *C. pantherina*, Solander MSS., having evidently accepted the suggestion that it was only a variant or a monstrosity of this variable and well-known shell.

Deshayes, in his 2nd Edition of Lamarck's Anim. S. Vert., 1844, enters it among the synonyms of *C. tigrina*, Lamarck; and Reeve, in his Conch. Icon. of 1845, under *C. pantherina*, Lamarck, says "*C. umbilicata* has been acknowledged a monstrosity."

This degradation of the species to the position of a monstrosity was doubtless due to the peculiar deformed appearance of the shell and to the fact that for more than twenty years no other specimens had been found and its *habitat* was still unknown. But in 1848 Mr. Roland Gunn wrote to Dr. Gray about a collection of cowries he had found on "the east shore of Barren Island, one of Hunter's islands, north-west of Van Diemen Land," and he sent one fine specimen to the British Museum. This Dr. Gray recognized as *C. umbilicata*, Sowerby, and placed definitely among his *Cyprovula* as "the giant of the genus," removed the reproach of monstrosity from it, and established it as a true and very remarkable species, the home of which had at last been discovered. It immediately leaped into notoriety and became valuable, for the second specimen sent to England by Mr. Gunn realized the handsome sum of £30; whereas in my Tankerville Catalogue, in which have been written the prices

paid at the sale of his shells, the sum of £3 3s. is entered against *C. umbilicata*, Sowerby.

Angas in 1867 recorded the dredging, in deep water 2 miles off the coast of New South Wales, a little south of Wollongong, of several living specimens, somewhat smaller and paler in colour than the ordinary Tasmanian examples.

Sowerby in his Thesaurus gives figures of Miss Saul's specimen, which is possibly the before-mentioned individual, offered to her by Mr. Gunn for £30, and which subsequently realized that sum: and also of one of those mentioned by Mr. Angas as being dredged by Admiral Loring off Wollongong.

Dr. Cox in 1880 created a variety, *alba*, for a shell obtained at Circular Head, Tasmania, pure white, and quite devoid of all the usual characteristic spots and colouration.

John Brazier in 1883 recorded typical examples found by Mr. Bailey at Cape Schanck and Portland, on the Victorian coast.

C. E. Beddome, in an exhaustive note, refers to an individual found by Dr. A. E. Cox at Port Stephens, New South Wales, only $2\frac{1}{2}$ in. long, lighter in colour than the Tasmanian shells, covered with light chestnut spots, base white, but not so highly enamelled as the southern forms found here (in Tasmania). He reproduces it (fig. 2, pl. xx.).

When out in the Federal trawler "Endeavour" in March, 1912, three large cowries, with a deep umbilicus, were obtained. Two of them were immature and very slightly coloured, but the third was mature, and resembled somewhat *Cypræa umbilicata*, Sowerby. I have regarded it as a variety of this species, and named it *Cypræa armeniaca* (from *armeniaca*, an apricot), because of the beautiful apricot-yellow colour of its base. Should other examples be found and establish its right to a specific distinction its name will stand, as I know of no other species so called.

***Cypræa umbilicata*, Sowerby; var. *armeniaca*, n. v.**

Shell solid, globular, very smooth and glazed. It has a well-marked umbilicus in which the volutions are plain; obsolete, narrow, flat, spiral bands occur on the right side of the dorsum. The base is convex. The aperture moderately wide, slightly dilated anteriorly, and then narrowing into a canal 8 mm. long; posteriorly very curved round the posterior part of the whorl and turning up behind and ending in a well-marked notch. The outer lip is bent in at a right angle, slightly convexly flattened, thick, with 38 rather small teeth,

almost confined to the inner edge. The teeth along the inner-margin are 29, narrow and very short, ending rather abruptly at their inner ends and rapidly becoming obsolete at their outer. The base is prolonged, thickened, and expanded on each side in front, especially on the left, and also at the back, where there is a considerable thickening round the notch, which is projected by it 8 mm. from the umbilicus, and some distance to the left of the centre of the spire.

The colour is whitish, but except along the line of union of the mantle-folds and just above the margins the white is obscured by clouds and blotches of light yellowish-brown and scattered chestnut spots, an irregular line of which bounds the upper edge of the right mantle lobe. The top of the anterior beak is painted blackish-brown, as is also the right side of the callus of the outer lip behind at its junction with the body-whorl. The whole of the base and outer lip is of a rich apricot colour, deepest outside the columellar teeth, which it tinges, and on the callus forming the anterior and posterior projections of the inner lip; it extends to both lateral margins and covers the dorsal surface of the anterior beak and the callus round the posterior notch. The left side of the body-whorl is of a delicate faint lilac tint, which fades insensibly into the yellow, white, and chestnut around. The interior is a creamy-white.

The animal is white, but the margin of its mouth is of a deep apricot colour, as is also the somewhat expanded semi-circular anterior end of the foot. The tentacles, about half an inch long, are of a paler tint, and so are their bases, which are about one-third as long and twice as stout, and bear the black eyes on their summits, outside the tentacles.

Dimensions.—Length, 3·9 in.; breadth, 2·5 in.; height, 2·2 in.

Locality.—100 fathoms, Great Australian Bight, 60 miles from shore, 80 miles west of Eucla, with 2 immature shells. The trawl worked over the sea bottom from 75 to 120 fathoms, so that they might have come from any intermediate depth.

The youngest example, taken at 80 fathoms in the Great Australian Bight 80 miles west of Eucla, is light and papery. It is 3 in. long by 2·2 in. wide and 1·9 in. high. Its outer lip is formed and bent in, and has 33 teeth, and there are 28 on the inner side of the aperture. The posterior notch touches the last whorl in the sunken spire, the anterior canal is smooth for 6 mm. beyond the teeth. There are faint axial growth-lines and numerous spiral flat bands. The ground-colour is white with a spiral disposition of brown smudges and streaks, which on the left side of the shell are united by a lighter

general brownish colouring. The base is of a faint apricot tint, which also tinges the columellar teeth. Near the base is a band of deep brown spots of varying size, which are found also on the base of the body-whorl; the anterior end and the lower third of the depressed spire and the adjacent part of the outer lip are of a dark walnut-brown.

A slightly older specimen, from 100 fathoms, is 3·5 in. long, 2·5 in. wide, and 2·2 in. high, has fewer brown spirals, with 36 outer and 26 inner and 4 intermediate teeth, the outer lip is rather more thickened, and the flat dorsal spirals are slightly more conspicuous.

I have had five examples of the Tasmanian form to compare it with, as well as the figures given by all the above-mentioned authors. Mine differs in shape, being more globular, higher, and wider, not only relatively, but absolutely. Mr. May kindly lent me two very diverse examples, which respectively measured 4·4, 2·3, 1·9 in. and 3·4, 2·1, 1·8 in. in length, breadth, and height, whereas mine is 3·9, 2·5, 2·2 in. Allowing, therefore, for the greater length of the anterior and posterior prolongations in Mr. May's large specimen, which is probably a senile change, mine is still more globular. It is interesting to notice the greater similarity between my specimen and the type, whose dimensions are: Length, 3·8 in.; and breadth, 2·3 in., which is different from that of most specimens. Sowerby does not give the height of his shell, nor a figure in profile, and it is difficult to estimate this from his figure, but it seems less elevated than mine. The concave depression on the under-surface of the forward projection is much less in mine, and the posterior curve of the aperture, its upward bending and the twist to the left are more marked. The colour is very different. The fairly uniform peppering with dark spots, the white base, the brown wide blotch over the middle third of the base of the body-whorl are wanting in mine, while the apricot base and the lilac side are absent from the typical shells.

It may be that the shape is due to its *habitat* in the quiet waters of 100 fathoms, and that though mature it is not senile, and its colouring to its having been taken alive instead of being washed up and partially bleached on the shore. But we will hope other specimens may be secured which will determine its right to be called a good species.

Type in my collection.

Trivia australis, Lamarck.

Cypræa australis, Lamarck, Anim. S. Vert., 1822, vol. vii., p. 404, and 1844 (Edition Deshayes), vol. x., p. 545. "The seas of New Holland" (M. Macleay); Sowerby, Conch. Illus., 1832,

fig. 29, p. 12 (1841), No. 112, "New South Wales"; Quoy and Gaimard, 1834, Voy. "Astrolabe," Zool., vol. iii., pl. xlviii., figs. 19-26; Menke, 1843, Moll. Nov. Holl., p. 30, *Cypræa* (*Trivia*), "Western shore of Australia"; Kiener, Coq. Viv., 1845, p. 138, Sp. 125, pl. xlviii., 2 bis; Reeve, Conch. Icon., 1846, vol. iii., pl. xxiv., fig. 138; Angas, Proc. Zool. Soc., London, 1867, p. 206; also 1878, p. 867, "Fowler Bay and Cape Northumberland," South Australia; Sowerby, *Cypræa* (*Trivia*), 1870, Thes. Conch., vol. iv., p. 45, pl. 325, figs. 439, 440 (*Cypræa*, pl. xxxiv.); Brazier, Proc. Zool. Soc., London, 1872, p. 86; Weinkauff, 1881, Conch. Cab. (Ed. Küster), Band. v., Abt. iii., p. 142, pl. xlix., figs. 14, 15; Tryon (*Trivia*), 1885, Man. Conch., vol. vii., p. 206, pl. xxiii., figs. 53, 54; Brazier, Proc. Linn. Soc., N.S.W., vol. ix., p. 29; Beddome, 1898 (*Trivia*), Proc. Linn. Soc., N.S.W., vol. xxiii., pl. xxi., fig. 19; Pritchard and Gatliff (1899), 1900, vol. xii. (New Series), p. 187, Victorian coast; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 374, Tasmania; Hedley and May, Records Austr. Mus., 1908, vol. vii., p. 111, No. 2, "100 fathoms, off Cape Pillar."

Taken in 80 fathoms 80 miles west of Eucla, 2 alive, without dorsal colour-blotches.

***Ovula philippinarum*, Sowerby.**

Ovula philippinarum, Sowerby, Proc. Zool. Soc., London, 1848, p. 136; also Thes. Conch., 1855, vol. ii., p. 481, Sp. 44, pl. c., figs. 57, 58, "Philippines"; Reeve, Conch. Icon., 1865, Sp. 46, pl. x., figs. 46a, 46b; Tryon, Man. Conch., 1885, vol. vii., p. 252, pl. iv., figs. 100-9. He gives among its synonyms *O. angasi*, A. Adams (from Port Curtis, Australia), etc.

One example, dredged in 72 fathoms 40 miles west of Eucla, 18.5 mm. in length, not quite so solid as the figures in the above plates seem to show.

***Tonna variegata*, Lamarck.**

Dolium variegatum, Lamarck, 1822, Anim. S. Vert., vol. vii., p. 261; also 1844 (Edition Deshayes), vol. x., p. 143, No. 6, "The seas of New Holland, in the Bay of Dogs"; Angas, Proc. Zool. Soc., 1867, p. 197, recorded for New South Wales; also by Hedley, Mem. Austr. Mus., 1903, vol. iv., p. 341; Tryon, Man. Conch., 1885, vol. vii., p. 262, pl. iii., fig. 13.

Tonna variegata, Lamarck, Hedley, Austr. Assoc. Adv. Science, 1909, p. 361, recorded for Queensland.

A fresh shell, 85 mm. by 65 mm., was taken in 100 fathoms 80 miles west of Eucla. This is the easterly limit on the southern Australian coast for the species to my knowledge. Its absence from South Australian, Victorian, and Tasmanian waters makes it probable it has come from the north round Cape Leuwin.

***Cassis fimbriata*, Quoy and Gaimard.**

Cassis fimbriata, Quoy and Gaimard, Voy. "Astrolabe," 1833, Zool., vol. ii., p. 596, pl. xliii., figs. 7, 8; Angas, Proc. Zool.

Soc., 1865, recorded for South Australia; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1900, vol. xii. (New Series), part 2, p. 188, recorded for Victoria.

One individual, 83 mm. long by 52 mm. broad and 46 mm. high, with three spiral rows of tubercles on the body-whorl, was taken alive in 100 fathoms, quite typical in form and colour, and a second one dead.

Cassidea adcocki, Sowerby.

Cassis adcocki, Sowerby, Proc. Mal. Soc., 1896, vol. ii., p. 14, text figure: *Type locality*—Yankalilla Bay, South Australia; Gatliff and Gabriel, Proc. Roy. Soc., Victoria, 1912 (New Series), part 1, p. 170, recorded for Bass Straits.

One example was taken dead in 100 fathoms 90 miles west of Eucla.

Cassidea pyrum, Lamarck.

Cassis pyrum, Lamarck, Anim. S. Vert., 1844 (Edition Deshayes), vol. x., p. 33, "New Holland"; Angas, Proc. Roy. Soc., 1867, p. 197, recorded for New South Wales; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1900, vol. xii. (New Series), part 2, p. 189; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 373 (*Semicassis*), recorded for Tasmania.

Cassis nivea, Brazier, Proc. Zool. Soc., 1872, p. 616, pl. xlv., fig. 1.

Cassis tumida, Petterd, Proc. Roy. Soc., Tasmania, 1886 (1885), p. 321.

Cassis thomsoni, Brazier, Proc. Linn. Soc., N.S.W., 1875, vol. i., p. 8; Hedley (*Cassidea pyrum*, Lamarck, var. *thomsoni*, Brazier), Mem. Austr. Mus., 1903, vol. iv., part 6, p. 341, pl. xxxv., figs. 2, 3.

Dredged in 100 fathoms 90 miles west of Eucla, 4; in 75 to 120 fathoms 120 miles west of Eucla, 1; in 95 fathoms 90 miles west of Eucla, 3. All were well coronated, with moderately exserted spires and with more or less marked axial plicæ on the inflation of the body-whorl, a little below the coronation. The colour when fresh was a pink-flesh tint, with a blackish-purple on the varix of the canal, and about seven blotches of black-purple on the outside of the recurved labrum, fading away towards the dorsum as vanishing spiral flames. Some have two spiral bands of orange blotches on the body-whorl.

One quite fresh shell was taken in 140 fathoms, 34 mm. 22.5 mm., without angle or tubercles or plicæ, with a thickened reflected lip, with seven purplish-black spots on it, a micromorph of the variety found to the east of Bass Straits.

Cassidea semigranosa, Lamarck.

Cassis semigranosa, Lamarck, 1822, Anim. S. Vert., vol. vii., p. 228, No. 23: *Type locality*—"The seas of New Holland";

Angas, Proc. Zool. Soc., 1865, p. 168 (*Semicassis*), recorded for South Australia; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1900, vol. xii. (New Series), part 2, p. 190, recorded for Victoria; Tate and May, 1901, Proc. Linn. Soc., N.S.W., vol. xxvi., p. 373 (*Semicassis*), "South and east coasts of Tasmania."

One dead shell, taken in 80 fathoms 80 miles west of Eucla.

Ficus tessellatus, Kobelt.

Ficula tessellata, Kobelt, Conch. Cab. (Ed. Küster), 1881, Band. iii., Abt. 3.B., p. 12, Sp. 6, Taf. ii., fig. 3: *Type locality*—Australia.

Pyrula tessellata, Kobelt, Tryon, Man. Conch., 1885, vol. vii., p. 267, pl. v., fig. 31, Rosemary Island, Australia.

One fragment, taken in 100 fathoms 90 miles west of Eucla. This is a new genus for the southern coast of Australia.

Cymatium rubicundum, Perry.

Septa rubicunda, Perry, 1811, pl. xiv., fig. 4; Gatliff, Vict. Naturalist, 1902, vol. xix., No. 5, p. 76; (*Lotorium*) Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1905, vol. xviii. (New Series), part 2, p. 41; (*Septa*) Gatliff and Gabriel, Proc. Roy. Soc., Victoria, 1908; (*Cymatium*) Hedley, 1909, Austr. Assoc. Adv. Sci., p. 360, "Queensland."

Triton australe, Lamarck, Anim. S. Vert. (Edition Deshayes), 1843, vol. ix., p. 625.

Triton nodiferus, Lamarck, Anim. S. Vert. (Edition Deshayes), 1843, vol. ix., p. 624.

Triton saulæ, Reeve, Conch. Icon., 1844, pl. v., fig. 17, "Philippines."

Examples were taken along the 100-fathom line. Three were only 40 mm. and 30 mm. in length. Each of these retained the protoconch, which was conical, and consisted of four quite smooth, sloping, slightly conical whorls. The extreme tip, however, in each example was absent. Three large ones were obtained alive up to 21 cm. long by 11 cm. broad, including the everted lip. These were somewhat more elongate and narrow than those found on the shore at Albany and Wedge Island and less solid, and were less deeply coloured than those taken on the beach on the west coast of Australia.

Cymatium verrucosum, Reeve.

Triton verrucosus, Reeve, Proc. Zool. Soc., London, 1844, p. 118, *hab.* (?); Conch. Icon., 1844, vol. ii., pl. xvii., fig. 71; Kobelt, Conch. Cab. (Ed. Küster), 1878, Band. iii., Abt. 2, p. 188, pl. liii., figs. 6, 7; Tryon, Man. Conch., 1881, vol. iii., p. 24, pl. xiii., fig. 117; Pritchard and Gatliff, *Lotorium verrucosum*, Reeve, Proc. Roy. Soc., Victoria, 1898 (1897), vol. x. (New Series), p. 266, recorded for Victoria; Tate and May, *Lampusia*, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 355, for Tasmania.

Triton quoyi, Reeve, Proc. Zool. Soc., London, 1844, p. 118; Conch. Icon., 1844, vol. ii., pl. xix., fig. 93.

Taken in 75 fathoms 80 miles, and in 100 fathoms 90 miles, west of Eucla. It has the ordinary characters of the *T. quoyi* form.

Cymatium vespaceum, Lamarek.

Triton vespaceum, Lamarek, 1822, also Lamarek, Anim. S. Vert. (Edition Deshayes, etc.), 1843, vol. ix., p. 636, *hab.* (?), 14 lines long; Kiener, Spec. Coq. Viv., vol. vii., 1842, p. 18, No. 13, pl. iii., fig. 2, "Indian Ocean"; Menke, Moll. Nov. Holl., 1843, p. 25, "West coast of Australia"; Tryon, Man. Conch., 1881, vol. iii., p. 22, pl. xii., figs. 94-100; Hedley (*Cymatium*), Austr. Assoc. Adv. Sci., 1909, p. 360, "Queensland."

Two examples, taken in 100 fathoms 90 miles west of Eucla, 23.5 mm. long and 20 mm. broad.

Gyrineum ranelloides, Reeve.

Triton ranelloides, Reeve, Proc. Zool. Soc., 1844, p. 111; Conch. Icon., 1844, No. 10, pl. iii., figs. 10a, 10b, *hab.* "Matnog, Province of Albay, Island of Luzon, Philippines (found on the reefs), Cuming"; Tryon, Man. Conch., 1881, vol. iii., p. 267, gives it as a synonym of *Ranella cruentata*, Sowerby.

Gyrineum ranelloides, Reeve, Hedley, Austr. Assoc. Adv. Sci., 1909, p. 361, "Queensland."

One living specimen was dredged in 101 fathoms 80 miles west of Eucla. The operculum is shown in pl. xvi., fig. 7, and the radula in pl. xvi., fig. 6. The shell is 50 mm. long by 24 mm. at its widest part, including the varix, with a shortly conical protoconch of five whorls. The first three are very depressed, scarcely rounded; the last two are convex, and rather rapidly increasing. The first four have two erect, sharp, hair-like spiral threads, at about equal distances from the sutures and each other, and numerous though not closely crowded, oblique similar axial threads. These gradually vanish towards the beginning of the last whorl; this ends abruptly where the ordinary sculpture of the spire-whorls begins. This consists of a row of large tubercles on the median angle, three rows of tiny tubercles above these and one below. On the body-whorl the last become successively larger, and another row succeeds them further forward, and several rows of large granules are intercalated. The tubercles are deeper yellowish-brown than the ground-colour, and there are stray axial flames of darker brown and articulated spirals of broken lines or tiny spots of brown. The reflected lip just beyond the varix is very daintily spotted on its inner margin with dark-brown, which clouds also the upper part of the inner lip between its white plicæ. The lower half of the columella is white, bordered above by the yellow of the back of the pre-

ceding snout. The round gutter at the back of the aperture is very marked. The varices do not run continuously from spire to spire as in *Ranella*, but stand one-fourth of the circumference behind that in the spire below.

An identical specimen was sent to me some years ago as from Japan by Mr. Sowerby under the name *Triton ranelloides*, Reeve.

Argobuccinum australasia, Perry.

Biplex australasia, Perry, 1811, *Conchology*, pl. iv., figs. 2, 4, "New Holland and Van Diemen's Land."

Ranella leucostoma, Lamarck, 1822, *Anim. S. Vert.*, vol. vii., p. 150.

Dredged in 101 fathoms 80 miles west of Eucla, 1 immature, 50 mm. by 27 mm., with a conical protoconch of four sloping convex whorls, the minute extreme apex appears to be absent; colour of shell, light bluish-grey, covered with a thin epidermis, like coarse muslin, with a minute erect hair at each intersection. Aperture quite white. Also, a mature shell 90 mm. by 43 mm., solid, and lighter in colour than those from Tasmania.

Nassaria torri, Verco. Pl. xiii., figs 3, 4.

Cominella torri, Verco, *Trans. Roy. Soc., S.A.*, 1909, vol. xxxiii., p. 271, pl. xxi., figs. 10, 11.

The species was founded on several examples collected on St. Francis Island thrown up among the rocks, but none of them were full grown, and all of them were more or less rolled and damaged. But on May 27, 1912, the Federal trawler "Endeavour" obtained a perfect specimen from a depth varying from 77 to 105 fathoms, about 40 miles west of the meridian of Eucla. It was inhabited by a hermit crab. It has nine whorls. The protoconch, comprising one and a quarter turns, is blunt, slightly excentric and smooth. The suture ascends for about a sixth of the circumference on the last whorl, and forms with a curved callosity on the inner lip, a narrow gutter at the back of the aperture.

The aperture is obliquely axially ovate, narrowed posteriorly to a gutter and anteriorly to a short, wide, oblique canal. The outer lip is thin, simple, uniformly convex, slightly reflected, smooth within. The inner lip is an expanded glaze on the body-whorl, thickened internally into a curved callus, extending slightly above the back of the aperture at the suture; anteriorly the labium is thick, detached from the base of the whorl, and carried forward over the very valid varix of the canal to form a false, well-marked umbilicus, and to join almost at a right angle with the left margin of the

canal, which is dorsally curved to run almost vertically for about half an inch. The varix of the notch projects as a very faint oblique prominence on the columella. The columella is sigmoidally concave above and convex below.

The bent canal removes it from the genus *Cominella* and separates it from *Phos* and places it in *Nassaria*. If this location prove correct it is a gigantic member of the genus, measuring 69 mm. in length by 29 mm. in breadth. A second example, not full grown and not in very good condition, was taken in 100 fathoms 90 miles west of Eucla.

***Siphonalia dilatata*, Quoy and Gaimard**

Fusus dilatatus, Quoy and Gaimard, 1833, Voy. "Astrolabe," Zool., vol. ii., p. 498, pl. xxxiv., figs. 15, 16; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1898 (1897), vol. x. (New Series), part 2, p. 272.

Fusus tasmaniensis, Adams and Angas, 1863, Proc. Zool. Soc., London, p. 421, pl. xxxvii., fig. 1.

Siphonalia maxima, Tryon, 1881, Man. Conch., vol. iii., p. 135, pl. liv., fig. 335.

Siphonalia oligostira, Tate, Trans. Roy. Soc., S.A., 1891, vol. xiv., p. 258, pl. xi., fig. 6.

Taken in 105 fathoms 30 miles west of Eucla, with marked angulation, valid sharp transverse coronating tubercles, with numerous crowded fine deep-brown spiral cords, the colour deepest in a rather broad band revolving over the middle of the body-whorl, the interior a beautiful vivid salmon-tint or white, two examples.

Taken in 100 fathoms 90 miles west of Eucla, 2 much longer and narrower examples, one with a more rounded shoulder, with rounder and more pliciform tubercles, fewer broader spiral cords, pure white both outside and in; the second from this station comes midway between this and the first two in its colouring and sculpture. One immature, 48 mm. long, taken in 72 fathoms 40 miles west of Eucla.

***Fusus novæ hollandiæ*, Reeve.**

Fusus novæ hollandiæ, Reeve, Conch. Icon., 1847, vol. iv., p. 197, pl. xviii., fig. 70; Angas, Proc. Zool. Soc., 1877, p. 179, recorded for New South Wales; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., recorded for Tasmania; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1898, vol. x. (New Series), part 2, p. 269, recorded for Victoria; in vol. xviii., 1906, p. 43, they state that the type is in the National Museum, Victoria.

One example was dredged in 100 fathoms 90 miles west of Eucla, with the mouth somewhat broken, 67 mm. long by 22 mm. wide, spire 24 mm. long. Its shoulder is median and sharply angled, with nine pliciform axial ribs, more

marked below the angle than above, much narrower than their interspaces; the four spiral threads above the shoulder very fine, those below it very fine but slightly larger; those on the body-whorl finer than in Tasmanian specimens. A bright reddish-brown spot between the costæ at the angle.

Fasciolaria australasia, Perry.

Pyrgula australasia, Perry, 1811, Conchology, pl. liv., fig. 4, "New Holland and Van Diemen's Land."

Fasciolaria coronata, Lamarck, 1822, Anim. S. Vert., vol. vii., p. 120.

One individual, dredged in 72 fathoms 60 miles west of Eucla, is rather a marked variant. It is 143 mm. long by 55 mm. at its widest part. The protoconch of two rounded smooth whorls is less eccentric and pulloid than usual. The spire is unusually long, 62 mm., of six whorls, very sharply shouldered just above the middle and markedly contracted at the sutures, with about eleven pliciform tubercles with sharp transverse summits, corded with a spiral thread. A very thin horny epidermis. Colour, first three spire-whorls brownish, all the rest quite white; interior pure white. Another individual, taken in 100 fathoms 80 miles west of Eucla, was, as to protoconch, shape, and colouration, one of the common coronated forms.

Scaphella undulata, Lamarck.

Voluta undulata, Lamarck, Ann. du Mus. Hist. Nat., vol. v. 1804, p. 157, pl. xii., figs. 1a, 1b.

Four examples, taken 80 miles and 90 miles west of Eucla from 72 to 105 fathoms, all immature and dead and quite typical.

Scaphella fulgetrum, Sowerby. Pl. xi. and xii.

Voluta fulgetrum, Sowerby, Tankerville Catalogue, 1825, p. 81, No. 2149; Appendix, p. xxviii., pl. iv., v.: *Type locality* unknown; Broderip, Zool. Jour., 1826, vol. ii., p. 35; Wood, Index. Test. Supp., 1828, p. 59, pl. iii., fig. 3; Anim. S. Vert., 1844 (2nd Edition, Deshayes, etc.), vol. x., p. 414; Sowerby, Thes. Conch., 1847, vol. i., p. 207, Sp. 35, pl. xlvi., figs. 33, 34; Reeve, Conch. Icon., 1849, pl. vi., figs. 13a, 13b; Chenu, Man. de Conch., 1859, vol. i., p. 191, fig. 973; W. F. Petterd, Journ. Conch., 1879, p. 344; Tryon, Man. Conch., 1882, vol. iv., p. 96, pl. xxviii., figs. 104, 105.

This species was described by G. B. Sowerby, sen., in the Sale Catalogue of the Earl of Tankerville's collection—the only specimen he had ever seen. It was a fine individual, and two excellent full-sized coloured figures are given of it. Its *habitat* was unknown. Broderip reproduced the description of it about a year later in the Zool. Jour., attributing

it to Sowerby. In 1849 Reeve says, "It was first described by Mr. Broderip from a specimen of rather large size in the celebrated Tankerville Collection, now in the British Museum," and places Broderip's name before Sowerby's in his references. This strange mistake evidently misled Petherd, who cites Broderip as the author of the species; but later writers correctly give Sowerby his due. Reeve is the first to give the *habitat* of the species, namely, South Australia. In my copy of the Tankerville Catalogue the price against the type specimen is £31 10s.

Variations.—It is very variable; one from Adcock's collection, not quite mature, is 7 in. long by 17.7 cm. by 8.3 cm. The type is described as 6 in. by 3 in. Mr. Mathews tells me in a letter that the largest he has seen was 8 in. by 3½ in., taken on Troubridge Island. But a mature shell, with ascending suture and fully-formed lip, may be only 3 in. by 1.55 in.

Another example is 4.3 in. by 1.7 in., so that if it were 6 in. long it would be only 2.4 wide—more than ½ in. less in diameter than the type. The shoulder, too, may be more marked than in the type, which is rather high-shouldered, and may be somewhat more concave below the suture. When senile the inner lip may have a thick axial pad of callus extending a full inch beyond the aperture. The glaze of the inner lip not only extends very far laterally over the body-whorl, but towards the spire for half an inch or more above the suture, and in shells with rusty-brown staining this covers the stain over and leaves a broad, wavy, whitish band above the suture throughout the last spire-whorl.

Tryon says, "*V. fulgetrum*, in fact, is intermediate between *V. fusiformis* and *V. papillosa*, and very probably the three are merely diverse forms of one species." I think the three species are distinct, the protoconch of *S. fulgetrum* is a sufficient diagnostic from either of the other species.

Sowerby, in the *Thes. Conch.*, refers to one variety (*S. dictua*, n. var., Verco, *Trans. Roy. Soc., S.A.*, 1909, vol. xxxiii., p. 274, pl. xxi., fig. 7) which has only a delicate reticulate lace-like colouration, and a second which has two rows of chestnut spots on the last volution. But the colour variations are quite numerous.

1. There is the typical shell with the axial zizag brown dashes from which the shell derives its name. It will be noticed these tend to have two spiral rows of blotches, one just below the shoulder and the other over the lower part of the body-whorl. The blotches are roughly crescentic or arrow-headed, with their concavity towards the outer lip. At the suture the markings are flame-like.

2. There may be two spirals of large crescentic or arrow-headed spots, with flames at the suture; var. *lunulisligata*.

3. These may be reduced to two spirals of small spots the size of peppercorns; var. *punctisligata*.

4. There may be no spots except a few small ones on the first and second spire-whorls, the surface being more or less deeply and densely reticulated with brown; var. *dictua*, Verco.

5. The axial lightning zigzags may be crossed by two continuous deep purple-brown bands, one below the shoulder, the other over the lower part of the volution; var. *connectens*.

6. The only colour ornament may be these two bands and some small flames at the suture, all the axial markings being absent; var. *bicineta*.

7. The subsutural flames may unite to form a third spiral band; var. *tricineta*.

8. Only the lower spiral band may be present, but this quite valid; var. *unicineta*.

9. There may be no colour-markings, the shell being pure white; var. *alba*.

I have had several of these colour varieties reproduced in pl. xi. and xii.

The *habitat* of the species is very restricted. It has been taken in both Gulf St. Vincent and Spencer Gulf, and at some points is a fairly common shell. Mr. Mathews says the blacks tell him the animal lives on sandbanks nine or ten chains from the shore, which are covered by about 18 in. of water at low spring tide. He has taken them crawling ashore. It has been collected as far to the east as Kingston, in Lacepede Bay. I found none on the beaches from Sceales Bay to Point Sinclair, nor on St. Francis Island nor at Esperance, Hopetoun, King George Sound, nor on the west coast of Australia. It has not been recorded from Victoria.

Its bathymetrical distribution is interesting. Taken alive, of large size and beautifully painted, in all its varieties in the shallow water of the gulfs, and with only the lace-like reticulations, from the lobster-pots at Port Victor, and in 75 to 120 fathoms of water from 40 to 120 miles west of Eucla, 9 examples. The shells from these greater depths were all dead, mostly the home of hermit crabs, and all had the faint reticulated ornament except two, which showed the single deep band; none had the axial lightning markings.

Scaphella verconis, Tate.

Voluta verconis, Tate, Trans. Roy. Soc., S.A., 1892, vol. xv., p. 125, pl. i., fig. 5: *Type locality*—Gulf St. Vincent (Verco).

Taken in 75 fathoms 80 miles west of Eucla, 1 dead, immature; in 80 fathoms same locality, 1 dead, mature; in 100 fathoms 90 miles west of Eucla, 3 dead, immature.

Scaphella translucida, Verco

Voluta translucida, Verco, Trans. Roy. Soc., S.A., 1896, vol. xx., p. 217, pl. vi., figs. 4, 4a.

In 100 fathoms 90 miles west of Eucla a large lump of coral was taken, and in a cavity of this when chopped open lay a perfect specimen dead, with a deciduous thin white smooth epidermis, 35 mm. long by 14 mm. broad, somewhat smaller than the type.

Scaphella dannevigii, n. sp. Pl. xiii. figs. 1, 2.

A large, thin, brown, polished, elliptical shell. Protoconch absent, the line of separation thin and jagged; the exposed pillar very oblique, thick, smooth, and rounded, concealing the projecting hemispherical apex of the shell. Whorls three, shouldered below the suture, at the upper fourth of the intersutural space. Shoulder coronated with tubercles, eleven on a whorl, none on the first whorl, the earlier tubercles pointed, the later becoming broad until about half as wide as the interspaces, shortly pliciform, but expanding, and vanishing before reaching the lower suture. Whorls sloping, concavely sub-gradate above the shoulder, sloping slightly convex below. Suture distinct, minutely channelled. Body-whorl large, oval, narrowed anteriorly. Aperture axially narrowly elliptical. Inner lip a thin extensive glaze over the whorl; outer lip immature, thin, uniformly convex, and (as the growth-lines show) curving roundly to a wide, rather shallow, anterior notch. Columella subconcave, three very oblique plaits, the lowest forming the margin of the canal.

Sculpture.—There are crowded, fine, wavy, spiral liræ, about twenty above the shoulder, less valid over this and soon becoming obsolete below it. Accremental striæ granulate these and become ruder towards the aperture. Colour, dark chestnut-brown, obscurely minutely spirally crowdedly flecked with white, with scattered darker-brown blotches, the tips of the tubercles a deep blackish-brown. A narrow creamy band, distinct on its under margin, indistinct along its upper border, starts just within the back of the aperture and winds round the body-whorl to the middle of the outer lip.

Dimensions.—Length, 16.3 cm., of the aperture 11.3 cm.; width, 8.33 cm., of the aperture 4.77 cm.; diameter of the protoconchal base, 18 mm.

Locality.—Type specimen taken in the trawl at 105 to 77 fathoms 90 miles west of the meridian of Eucla.

In 1896 off Newland Head, outside Backstairs Passage, I dredged a dilapidated broken specimen lacking the whole of its last whorl, but measuring 23.5 cm. in length, so that in life it must have been a very large shell. No others were taken by me till I secured the type and eight other examples from the material brought up by the trawl of the "Endeavour" in water ranging from 75 to 105 fathoms, and extending from 40 to 120 miles west of Eucla.

The protoconch was absent from every example. Apparently it is normally deciduous, and must be shed early, as it is absent from a well-preserved specimen 11 cm. long. It must be large, and probably resembles that of *S. mamilla*, which, however, is almost always intact. The whitish band may be centrally well marked and fade away at both margins.

The species is named after Mr. Dannevig, the Commonwealth Director of Fisheries, to whom I was indebted for much help in securing the material obtained during my short voyage on the "Endeavour."

Type in my collection.

Scaphella roadnightæ, McCoy. Pl. xvi., figs. 1, 2.

Voluta roadnightæ, McCoy, Ann. Mag. Nat. Hist., 1881, vol. viii., 5th Series, p. 89, pl. vii., figs. 1, 2: *Type locality*—Ninety-mile Beach, Gippsland, Victoria; Tryon, Man. Conch., 1882, vol. iv., p. 96, pl. xxx., fig. 128; Sowerby, Thes. Conch., 1887, p. 298, Sp. 78, pl. 573 (*Voluta*, pl. xiv.), fig. 143; Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1897, vol. x. (New Series), part 2, p. 282, "Portland (Nat. Mus.)"; A. Kenyon, Proc., Mal. Soc., London, 1899, p. 267; Baldwin-Spencer, Proc. Mal. Soc., London, 1901, vol. iv., p. 184; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., part 3, p. 360, Maria Island (May), east coast, near Swansea (Mrs. Irvine), Tasmania; Pritchard and Gatliff, *op. cit.*, 1906 (1905), vol. xviii., part 2, p. 45.

This species was found by Baron von Mueller when on a visit to the Gippsland Lake District at his hotel, where it was in use to prop open his bedroom window. It had been found on the Ninety-mile Beach by Mrs. Roadnight, his landlord's mother, after whom it is named. It was given by Mueller to Sir Frederick McCoy, who described it in 1881. In 1899 some seven specimens were known, two of them from the eastern coast of Tasmania. Later, several were obtained from lobster-pots on the Victorian coast, and Mr. Bastow kindly sent me one. Mr. Dannevig, the Director of Fisheries, tells me he has taken several specimens when trawling off the coasts of Victoria and Tasmania, east of Bass Strait, all dead; and occasionally off the South Australian coast, but the first living examples were brought up from about 100 fathoms

some 40 miles west of Eucla. They were of medium size, mature, and almost destitute of the zigzag colour-markings. When the trawler was in the Great Australian Bight in 1912 several examples were taken along the 100-fathom line in various stages of preservation. All were inhabited by hermit crabs but one; from this a radula was obtained. From the material thus provided the following information is supplied:—The shell when mature may measure only 4 in. long by $2\frac{1}{2}$ in. broad, or it may reach 9 in. by $4\frac{3}{4}$ in. One example is 7 in. by $4\frac{1}{2}$ in., proportionately much more ventricose, with a shorter spire, though with the same number of whorls. The protoconch is very conspicuous and is never absent, which is remarkable, since fully three-fourths of a large hemisphere projects. It is set obliquely, so that the nuclear spheroid has its flattened pole on one side. The initial point is deep blackish-brown, and this colour runs along the nuclear suture, and gradually spreads and fades out. There is no defined inner lip, except in one example, a micromorph, which has a detectible glaze spreading over the base of the body-whorl. In mature shells the outer lip ascends well and rapidly at the suture for a full inch in larger examples, and is here markedly everted, and the whole of the outer lip is somewhat curved out. There is a well-marked anterior notch $\frac{3}{4}$ in. deep by 1 in. wide, and the low wide rounded varix of the notch winding round to the upper plait on the columella forms a low furrow, which in senile shells become filled up and even convex. The plaits are normally three, and remain unchanged in senile shells; but often another plait arises between the lowest two, sometimes between the highest two, and once above all the rest. When senile the shell becomes very heavy, thickened especially on the inner side of the everted lip and along the columella. Colour: the typical tint is pale-yellowish, but it may be a rich chestnut-brown. The ornament consists typically of axial series of oblique lines in zigzag arrangement; these oblique lines may be very long, going one-third round the shell, concealing any axial disposition, or they may be short and close set and blotchy at their junction, so as to exaggerate it. Sometimes they are altogether absent, leaving only the ground-tint, almost an albino variety, as in the two examples taken alive by Mr. Dannevig in 100 fathoms west of Eucla. In some specimens a white spiral band, starting from the aperture just below the suture, winds round the shell and interrupts all the colour-markings. The radula (pl. xvi., figs. 1, 2) from a living individual of 21 cm. in length measures 21 mm. by 1 mm., and consists of a single line of seventy imbricating, tricuspidate, rachidian teeth only. The old teeth have their cusps completely worn away, and are reduced to the crescent-shaped bases.

Scaphella papillosa, Swainson. Pl. xiv., figs. 1-3.

Voluta papillosa, Swainson. Appendix, Bligh Catalogue.

Voluta papillaris (*papillosa*), Swainson, Sowerby, Genera of Shells, 1820-1825, pl. ccli., no locality. According to a note by W. J. B., "the slight alteration here given in the trivial name is only to be considered in the light of a correction of the press." Mr. Sowerby, sen., or Mr. Broderip is, therefore, responsible for the change in the specific name. Kiener, in Coq. Viv., 1839, under the name of *Voluta sowerbyi nobis*, pl. 1., 2 figs., gives figures of *V. fusiformis*, Swainson, and refers to them in mistake as *V. papillaris*, Sowerby, and changes the name to *V. sowerbyi*.

Swainson, in Lardner's Cabinet Cyclopaedia, Natural History, Malacology, 1840, p. 108, calls his shell *Scaphella papillaris*, and figures it in the text 12A, and on page 318 refers to it as *Scaphella papillosa*, Sowerby, Gen., as though uncertain which name to retain. Sowerby, in Thes. Conch., vol. i., 1847, p. 207, Sp. 36, pl. xlvii., fig. 30, cites its *habitat* as "Fijee Islands." Reeve, Conch Icon., 1849, vol. vi., pl. iv., fig. 10, gives Port Lincoln as a *habitat*, under the name *Voluta papillaris*. He writes, "Mr. Swainson named this species *papillosa*, with the view of drawing attention to the remarkable papillary structure of the apex, but as the word signifies 'full of papillæ' it is better rendered *papillaris*. Taking it to refer to the painting, and confounding the species with *V. fusiformis*, M. Kiener has changed the name to do honour to Mr. Sowerby (calling it *V. sowerbyi*, Kiener), because the spots have so rarely the appearance of papillæ." Mr. Sowerby acknowledges the compliment in language severe but not the less true, by calling it "an absurdity." Gray, in Proc. Zool. Soc., London, p. 63, calls it *Volutella papillosa*, Gray. Crosse, Jour. de Conch., 1871, vol. xix., p. 297, refers to it as *Voluta* (*Alcithoe*) *papillosa*. Petterd, in Jour. of Conch., 1879, p. 343, as *Voluta papillosa*, Swainson, cites it as from the north coast of Tasmania and Encounter Bay, South Australia, and off the coast of New South Wales, between Montague Island and Twofold Bay, dredged in 1,900 fathoms (Brazier). He creates and describes a variety *macquariensis*, of a uniform yellowish colour without bands or reticulate markings, from Macquarie Harbour, west coast of Tasmania. Tryon, Man. Conch., 1882, vol. iv., p. 96, pl. xxviii., fig. 106, as *Voluta* (*Alcithoe*). Brazier, in Proc. Linn. Soc., N.S.W., 1897, vol. xxii., p. 779, describes *Voluta kenyoniana*, from Cape Everard, Victoria, a form with 19-20 axial obtuse ribs, which in Proc. Mal. Soc., London, 1906-7, vol. vii., p. 6, was recognized as only a variety of *Voluta papillosa*, Swainson. Pritchard and Gatliff, Proc. Roy. Soc., Victoria, 1898 (1897), vol. x. (New Series), p. 282, give "Phillip Island, Western Port, Portland." Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 360.

Between 40 and 120 miles west of Eucla, about the 100-fathom line, 4 examples were taken. Two, which were mature, measured only 80 mm. in length by 32 mm. in breadth and 71 mm. by 30 mm. One nearly mature, 65 mm. by 29 mm., and one immature, 53 mm. by 22 mm. A specimen from Port Victor measures 105.2 mm. by 50 mm., and one from Victoria 124 mm. by 59 mm.; so that the deep-sea examples are much smaller and proportionately narrower. But their colour is typical, though faint (all were dead shells). They all show the typical proximity and heaping up of three plaits, with a very small plait behind these, and a distinct anterior plait close to and almost forming the border of the canal, though this last was absent from the juvenile example. One of the mature individuals showed obsolete axial costæ on the base of the body-whorl, just beyond the inner lip, so approximating to var. *kenyoniana*, Brazier. Further east the trawler "Endeavour" had taken several examples of this variety, probably to the east of Bass Straits, all dead. A mature micromorph was 65 mm. long by 32.5 mm. broad, the largest was 112 mm. long by 49 mm. broad. The costæ are more numerous than in the type of the variety described by Brazier (19 to 20), 54 being counted in the penultimate whorl. But their validity and their number vary in the examples examined. In the micromorph they are less crowded, and in another specimen they are almost absent from the body-whorl. The protoconch and ornament resemble those of the specific type. I have had one of these figured on pl. xiv., figs. 2, 3.

Since writing the above Mrs. Agnes Kenyon has kindly lent me the type specimen of Brazier's species for comparison. This can scarcely be said to have 19-20 obtuse ribs, as he describes it. On the body-whorl 44 axial costæ can be counted, and none in the last inch from the aperture. These are rather sharp at their summits, but broad at their bases, and vary very greatly in their size and proximity. In the penultimate there are about 50, but they are so irregular in size and nearness that it is difficult to count them, and they scarcely can be called ribs, but are rather irregular axial costulæ. The figs. 2 and 3 on pl. xiv. are an almost exact reproduction of the type, though taken from an "Endeavour" specimen in my collection.

Cymbium flammeum, Bolten.

Cymbium flammeum, Bolten, Mus. Boltenianum, 1798, p. 151, No. 1899, No. 3.

Voluta diadema, Lamarck, Ann. du Mus., vol. xvii., p. 57, No. 1.

Var. Cymbium miltonis, Gray.

Voluta miltonis, Gray, 1833, Griffith's Cuvier's Animal Kingdom, vol. xii., Mollusca, 1834, pl. xxix. (1833); Kiener, Coq. Viv., 1839, p. 10, Sp. 6, pl. x.

Cymbium miltonis, Gray, Conch. Cab. (Ed. Küster), 1841, Band. v., Abt. 2, p. 213, Taf. xlii., fig. 1.

Voluta miltoni, Gray, Deshayes, Anim. S. Vert., 1844 (2nd Edition), vol. x., p. 406, Sp. 46.

Melo miltonis, Gray, Broderip, Thes. Conch., 1847, vol. i., p. 415, Sp. 7, pl. lxxxiii., figs. 24, 25.

Cymbium miltonis, Gray, Reeve, Conch. Icon., 1861, pl. xvi.

Melo miltonis, Gray, Angas, Proc. Zool. Soc., London, 1878, p. 865.

Melo diadema, Lamarck, *var. miltonis*, Gray, Tryon, Man. Conch., 1882, vol. iv., p. 82, pl. xxiii., fig. 28.

It is well figured in Griffiths' Edition of Cuvier's Animal Kingdom, but no description is given, and its name does not appear in the letterpress. Reeve says it was named in honour of Lord Milton, afterwards Earl Fitzwilliam. Its *habitat* was unknown, and is first recorded in Thes. Conch. as from Swan River, Australia. Later Mr. Angas cited it from Fowler Bay, on the South Australian coast, and Mr. Bednall gave me a specimen labelled Streaky Bay, a little distance further east. Three specimens were taken by the Federal trawler "Endeavour," all dead, one in 95 fathoms 90 miles west of Eucla, measuring 11 cm. by 6.2 cm., with four distinct columellar plaits; a second in 88 to 100 fathoms in the same locality, of 17.3 cm. by 9.7 cm., also with four distinct plaits; and a third 19.2 cm. long, with only three plaits, corresponding with the anterior three of the other specimens. It has a much more prominent protoconch and a more elate spire than the second, but otherwise they are quite similar.

Two individuals, from Fowler Bay, obtained from Mr. W. Reed, were taken alive. They have the typical narrow elliptic form, somewhat elate spire, the incurved spines, and four columellar plaits, with abundant white triangles in the ornament. Their walls are of medium thickness. One has in the body-whorl six well-marked axial costations, corresponding with similar axial gutters within, and running down from the spines, showing that the animal curved its shell outwards as it proceeded to form the scale of the spine, and curved it in as it completed the spine.

Ancilla oblonga, Sowerby.

Ancillaria oblonga, Sowerby, Spec. Conch., 1830, part 1, p. 7, figs. 38, 39; Kiener, Coq. Viv., 1843-44, p. 15, No. 10, pl. iv., fig. 2, "The shores of New Holland"; Reeve, Conch. Icon., 1864, vol. xv., pl. viii., figs. 24a, 24b; Sowerby, Thes. Conch., 1866, vol. iii., p. 65 (*Ancillaria*, p. 9), No. 38, pl. ccxiii. (*Ancillaria*, pl. iii.), figs. 57, 58; Tryon, Man. Conch., 1883, vol. v., p. 96, pl. xxxix.,

fig. 47, as a synonym of *A. marginata*, Lamarck; Watson (*Ancilla*), 1886, "Chall.," Zool., vol. xv., p. 231, "38 fathoms, off Bass Strait"; Tate and May, Proc. Linn. Soc., N.S.W., 1901, vol. xxvi., p. 365, "Tasmania" = "*A. fusiformis*, Petterd"; Hedley (*Ancillaria*), Memoirs Austr. Mus., 1903, vol. iv., part 6, p. 364, "New South Wales"; Hedley (*Ancilla*), 1909, Austr. Assoc. Adv. Sci., p. 363, "Queensland."

Taken in 100 fathoms 90 miles west of Eucla. Mr. Gabriel has sent me two examples dredged in Western Port, Victoria.

Ancilla mucronata, Sowerby.

Ancillaria mucronata, Sowerby, Thes. Conch., vol. iii., 1866, p. 63, No. 30, pl. 211, figs. 11, 12, "Australia"; Reeve, Conch. Icon., 1864, Sp. 10, pl. iv., figs. 10a, 10b, "Tasmania"; Kiener, Coq. Viv., 1843-44, *Ancillaria*, p. 7, Sp. 4, pl. iii., fig. 3, "The shores of New Holland." This figure is most like our shell in colouring.

Taken in 75 fathoms 80 miles west of Eucla, 1; in 80 fathoms 80 miles west of Eucla, 3; in 100 fathoms 90 miles west of Eucla, 1; in 105 fathoms, 3; in 140 fathoms, 2.

They were all dead, but several in very good condition, of a cinnamon or salmon colour, palest in the upper part of the spire and deepest between the lowest white band and the white columella, not quite so deep in the wide space between the two narrow white bands on the body-whorl. Kiener's figure is a fair representation of it. It is quite unlike *A. beachportensis*, Verco.

Hemipleurotoma quoyi, Desmoulins.

Pleurotoma quoyi, Desmoulins, Actes. Soc. Linn., Bordeaux, 1842, p. 61.

Hemipleurotoma, Verco, Trans. Roy. Soc., S.A., 1909, vol. xxxiii., p. 294.

Taken in 100 fathoms 90 miles west of Eucla, 2.

EXPLANATION OF PLATES.

PLATE X.

- Fig. 1. *Cypræa armeniaca*, Verco, dorsal view.
 " 2. " " " ventral view.
 " 3. " " " side view.

PLATE XI.

- Fig. 1. *Scaphella fulgetrum*, Sowerby.
 " 2. " " " var. *lunulisligata*.
 " 3. " " " var. *connectens*.

PLATE XII.

- Fig. 1. *Scaphella fulgetrum*, Sowerby, var. *tricincta*.
 " 2. " " " var. *unicincta*.
 " 3. " " " var. *punctisligata*.

PLATE XIII.

- Fig. 1. *Scaphella dannevigii*, Verco,
 ,, 2. ,, ,, ,, apex.
 ,, 3. *Nassaria torri*, Verco, side view.
 ,, 4. ,, ,, ,, ventral view.

PLATE XIV.

- Fig. 1. *Scaphella papillosa*, Swainson, micromorph.
 ,, 2. ,, ,, ,, var. *kenyoniana*, Brazier,
 ventral view.
 ,, 3. ,, ,, ,, var. *kenyoniana*, Brazier,
 side view.

PLATE XV.

- Fig. 1. *Acmæa calamus*, Crosse and Fischer, var. *polyactina*, Verco
 ,, 2. ,, ,, ,, ,, variety.
 ,, 3. *Patella axiaerata*, Verco, dorsal view.
 ,, 4. ,, ,, ,, side view.
 ,, 5. *Acmæa patellavecta*, Verco, dorsal view.
 ,, 6. ,, ,, ,, interior.
 ,, 7. ,, ,, ,, side view.

PLATE XVI.

- Fig. 1. *Scaphella roadnightæ*, McCoy, radula.
 ,, 2. ,, ,, ,, worn down.
 ,, 3. *Acmæa alticostata*, Angas, radula.
 ,, 4. ,, ,, ,, lateral tooth.
 ,, 5. ,, *patellavecta*, Verco, radula.
 ,, 6. *Gyrineum ranelloides*, Reeve, radula.
 ,, 7. ,, ,, ,, operculum.